Final report

Management and bureaucratic effectiveness

A scientific replication

Imran Rasul
Daniel Rogger
Martin J. Williams

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MANAGEMENT AND BUREAUCRATIC EFFECTIVENESS:
A SCIENTIFIC REPLICATION[*]

IMRAN RASUL   DANIEL ROGGER   MARTIN J.WILLIAMS[†]

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Abstract

A burgeoning area of social science research examines how state capabilities and bureaucratic effectiveness shape economic development. This paper is among the first scientific replications of a study on the effective functioning of bureaucracies in developing country contexts. We build on our earlier work linking management practices for middle-tier bureaucrats and public sector output in the Federal Civil Service of Nigeria [Rasul and Rogger 2016], aiming to establish the scientific replicability of those findings in a similar institutional and economic context: the Civil Service of Ghana. At the same time, the replication probes the robustness of our earlier findings to methodological differences in how management practices, and bureaucratic output and effectiveness, are measured. Our key findings are that in both civil services, granting bureaucrats more autonomy is positively associated with the effectiveness of bureaucracies, while management practices related to the provision of incentives or monitoring are negatively associated with their effectiveness. By shedding light on where pockets of good functioning exist within generally weak political institutional structures, the results have important practical and methodological consequences for the future study of bureaucracies and state capability. *JEL Classification: J33, O20.*

1 Introduction

A burgeoning area of social science research examines how state capabilities shape economic development [Besley and Persson 2011, Acemoglu and Robinson 2012, Pepinksy *et al.* 2017]. Much attention has been placed on understanding the effectiveness of government bureaucracies, a key component of state capability. Bureaucratic effectiveness matters for macroeconomic outcomes such as growth and inequality, and for microeconomics given the presumption that successful micro-evaluations of interventions can lead to them being effectively scaled-up by government.

Despite the importance of bureaucratic effectiveness, economic analysis of public sector agents has focused on the selection, and response to incentives, of frontline public sector workers. In contrast, this paper contributes to a nascent body of work studying the vital middle-tier of bureaucrats in central government civil services in developing economies [Bertrand *et al.* 2016, Finan *et al.* 2016]. Specifically, we study whether the management practices that middle-tier bureaucrats operate under correlate to the effective delivery of public services they are responsible for.[1]

We build on our earlier work linking management practices for middle-tier bureaucrats and public sector output in the Federal Civil Service of Nigeria [Rasul and Rogger 2016, henceforth RR]. We aim to establish the scientific replicability of those findings in a similar context: the Civil Service of Ghana. In the Nigerian context, RR documented robust partial correlations between bureaucratic output and two dimensions of management practice. In particular we found that: (i) the provision of autonomy to bureaucrat was positively correlated to bureaucratic effectiveness; (ii) the provision of incentives to and monitoring of bureaucrats was negatively correlated to bureaucratic effectiveness.

These are dimensions of management that the public administration and economics literatures have long emphasized. Autonomy has been emphasized in public administration literature as a key driver of bureaucratic effectiveness: at one extreme lies the view that there should be full delegation of decision making rights to bureaucrats, where society can then rely on bureaucrats' professionalism and resolve to deliver public services [Simon 1983]. At the other extreme lies the Weberian view, that the misalignment of objectives of bureaucracies and society implies only a rules-based system can ensure acceptable levels of public service delivery. On incentives and monitoring, a vast contract theory literature emphasizes the effectiveness of well-designed monetary incentives in private sector settings. The use of performance incentives are a central part of 'New Public Management' agenda sweeping through government bureaucracies, yet the evidence base remains thin and mostly based on evidence from frontline workers rather than the kinds of middle-

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[1]There are well-documented reasons why management practices could have different impacts on middle-tier bureaucrats than for lower-tier frontline public sector workers [Dixit 2002]. The selection, objectives and motivations of middle-tier of bureaucrats might differ. The nature of work for middle-tier bureaucrats might also differ: they might need to multi-task, and the mapping between effort inputs and observable output is perhaps more uncertain. Finally, there can be specific labor market rigidities applying to middle-tier bureaucrats, leading to different dynamic selection effects than for frontline workers.

tier civil servant we focus on here. For example, Perry *et al.* [2009] review 57 studies on pay for performance in the public sector and conclude 'pay-for-performance continues to be adopted but persistently fails to deliver'.

Our replication exploits the obvious similarities between the Nigerian and Ghanaian contexts, in terms of civil service structures and economic environment. At the same time we establish the robustness of our earlier findings by deliberately introducing methodological differences across settings in how we measure key concepts related to management practices, and public sector output and effectiveness. Many social and natural sciences are actively discussing the replicability of research, although there remains no consensus on the precise meanings of reproducibility, replicability and robustness. Hamermesh [2007] and Clemens [2015] provide two prominent definitions of replication in economics. Our analysis amounts to a *scientific replication* [Hamermesh 2007] or *robustness extension* [Clemens 2015] of RR. The balance between similarity and difference across studies is perhaps what marks out replication in economics from that in the natural sciences. We thus agree with Hamermesh [2017] when he writes, "the more important type of replication is not like that of the 'hard-scientific' research, but rather in the only sensible way for a social science – by testing the fundamental idea or construct in a different social context."[2]

This paper is among the first scientific replications of a study on bureaucratic effectiveness across developing countries. Replicating findings within this nascent literature is especially valuable because: (i) each individual study is nearly always limited to a relatively small number of bureaucratic organizations when studying middle-tier civil servants working in centralized ministries; (ii) establishing robust findings across similar contexts helps underpin the external validity of any given study, and so moves the knowledge frontier closer to establishing stylized facts; (iii) establishing scientific replication when alternative methodologies and measurement tools have been used can help future researchers collect data more cost-effectively; (iv) where differences in results emerge, this helps focus researchers' attention on specific sources of heterogeneity.

RR studied how the management practices bureaucrats operate under correlate to the quantity of public services delivered by the Federal Civil Service in Nigeria. They hand-coded independent engineering assessments of project completion rates for 4700 public projects. For each of 63 civil service organizations tasked to implement these projects (including 10 ministries and 53 other Federal civil service organizations), RR conducted a survey among senior bureaucrats to elicit management practices in place for middle-tier bureaucrats, building on methods pioneered by Bloom and Van Reenen [2007], and Bloom *et al.* [2012] (henceforth BSVR).

Our scientific replication in Ghana introduces changes in the measurement of key variables. The

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[2]Attention is being placed on scientific replicability in the social sciences, including economics [Bohannon 2016, Christensen and Miguel 2016], political science [Franco *et al.* 2014], psychology [Open Science Collaboration 2015], sociology [Gerber and Malhotra 2008] and finance [Harvey *et al.* 2015]. Such concerns extend to the hard sciences, where for example, there has been much discussion over the lack of replication in neuroscience [Steckler 2015]. In economics there has been a long-standing debate on the transparency, reproducibility and credibility of research, heightened by evidence of p-hacking and low rates of attempted replication [Christensen and Miguel 2016].

first relates to measuring the output and effectiveness of bureaucracies. This is necessitated by the fact that civil service bureaucracies worldwide differ greatly in whether and how they collect data on their own performance. Unlike macroeconomic or household survey data, statistical agencies are typically not involved in measuring government effectiveness, and few international standards exist to aid cross country comparisons. The second change is an alternative approach we trialed to measuring management, which is still anchored in the BVSR methods but is designed to probe the sensitivity of results to differences in how such data is collected and conceptual differences in the measurement of specific practices.

The first result our replication establishes is that the lack of specialization in public service delivery observed in Nigeria, is also a feature in Ghana: *multiple* organizations conduct similar project activities in both settings. A consequence is that in both settings we exploit a research design that measures the partial correlation of management practices with public service delivery *within* project type, namely, conditioning on project fixed effects and so accounting for any unobserved heterogeneity across projects that bureaucracies are tasked to provide, and holding constant characteristics of projects, organizations and bureaucrats.

RR's main results from Nigeria were as follows: (i) the provision of autonomy to bureaucrats is robustly positively correlated with the effectiveness of bureaucratic organizations; (ii) the provision of incentives/monitoring is robustly negatively correlated with project completion rates; (iii) the magnitude of these effects are economically significant. We scientifically replicate these findings in Ghana. Moreover, we find the association between each dimension of management practices and bureaucratic effectiveness to be qualitatively and quantitatively similar in each setting. Our findings on autonomy for bureaucrats across contexts suggest civil service organizations could delegate some decision making to bureaucrats, relying on their professionalism to deliver public services. It is especially noteworthy that in these contexts, the evidence does not support the hypothesis than when bureaucrats have more agency, they are more likely to pursue their own objectives or engage in corrupt activities, resulting in reduced public service delivery.

The robust *negative* correlation documented between project completion rates and management practices related to the provision of incentives/monitoring of bureaucrats across contexts is surprising and runs counter to a body of evidence from private sector settings [Prendergast 1999]. In this scientific replication we are able to investigate a few potential mechanisms for this, in particular how the results are heterogeneous based on two characteristics of bureaucrats: their tenure and their perceptions of corruption in their bureaucratic organization. On tenure we find somewhat similar findings across settings, so that the negative association of bureaucratic performance with practices related to incentives/monitoring is even more negative with more experienced bureaucrats. The heterogenous results by corruption are more varied across settings, highlighting the need for future researchers to pay attention to this specific margin.

Overall, our scientific replication helps to: (i) strengthen the external validity of core findings in each individual context, establishing that robust associations exist between the management

practices the vital middle-tier of civil service bureaucrats operate under and the effectiveness of public service delivery; (ii) propose alternative methodologies and measurement tools future researchers can use and build on, as well as highlighting some areas of heterogeneity where results differ across settings; (ii) finally, building on much of the earlier literature examining cross-country differences in bureaucratic effectiveness in weak states, here we make progress of what drives within-country variation across organizations all operating within the same overarching set of political institutions.

2   Context and Data

Nigeria and Ghana are West African states home to 210 million individuals, corresponding to one-fifth of the population of sub-Saharan Africa. Both central government bureaucracies are based on British colonial origins, where ministries are the central coordinating authority. Table 1 provides descriptive evidence for both settings. Both government bureaucracies devote a similar share of their total expenditures on wages, although the Ghanaian bureaucracy is better ranked in effectiveness and on corruption in international indices. Nigerian bureaucracies tend to have more staff, while the hierarchical structure differs across contexts, so the span of control of senior bureaucrats is considerably lower in Nigeria. This might translate into varying impacts of management practices on bureaucratic effectiveness. Despite faring worse on international indices of effectiveness, Nigerian bureaucrats are slightly more educated than their Ghanaian counterparts, and there a greater share of women in service in Nigeria. Finally, the labor market for bureaucrats in both settings are inflexible: appointments are made centrally, and bureaucrats enjoy long tenure in service with infrequent transitions between organizations. Such rigidity can slow down diffusion of best management practices.

2.1   Projects and Output

Civil service bureaucracies differ greatly in whether and how they collect data on their own performance. Unlike macroeconomic or household survey data, or those related to labor markets, firms or education, central statistical agencies are typically not involved in measuring government effectiveness, and few international standards exist to aid cross country comparisons. A motivation behind our scientific replication is to understand whether emerging findings on the correlates of government effectiveness are robust to alternative forms of data collection to measure the output and efficiency of bureaucracies. As detailed in the Appendix, we thus use different approaches to measuring projects and output across contexts.

In Nigeria we exploit a specific policy: in 2006/7 the Nigerian Government undertook the Overview of Public Expenditure in NEEDS (the 'OPEN initiative'), in which it traced, by project, the use and impact of a representative sample of 10% of federal social sector expenditures approved

in 2006/7. Under the OPEN initiative, expert teams visited projects to record their implementation. This monitoring process was independent of civil servants: projects were evaluated by teams of independent engineers and civil society. As described in the Appendix, a system of checks and balances were in place to underpin the credibility of the initiative.

We hand-coded the material from all projects recorded in OPEN initiative reports from 63 federal civil service organizations, covering 4721 projects with an aggregate budget of US$800 million. Eleven project types are covered (road, borehole, training etc.) with boreholes being the modal project type, and 75% of projects relating to small-scale infrastructure. The main outcome we use is a *continuous* zero to one measure coded by monitoring teams of each project's completion rate. A completion rate of zero implies inspectors found no hard evidence of the project being attempted. A completion rate of one implies the project matched its full technical specification.

In Ghana there has been no major data collection effort comparable to OPEN in Nigeria: this is not surprising given the complexity and cost of OPEN, which amounted to over $1mn annually. However, each Ghanaian civil service organization is required to provide quarterly and annual progress reports. These detail targets and achievements for individual projects. Progress reports cover the *entire* range of bureaucratic activity, including project types that have been much studied, such as procurement and infrastructure, but also including areas of activity that have been less subject to quantitative study, such as policy development, advocacy, human resource management, budgeting and regulatory design.

The Ghanaian data reveals the importance of non-infrastructure projects in the work of bureaucracies. Figure A2-G shows the most common project type in Ghanaian central government bureaucracies relates to human resource management ('monitoring, training and personnel management'). Comprising 29% of all projects, this reinforces the importance of understanding whether the management practices bureaucrats operate under correlate to bureaucratic effectiveness. Figure A2-G also shows that 23% of projects relate to policy advocacy and development, while the two traditional areas of quantitative study, infrastructure and procurement, cumulatively correspond to around a third of projects.

We use these progress to create completion rates for 3628 projects underway during 2015 in 31 organizations . The Appendix describes approaches to validating the reliability of such data. The data collection method used in Ghana is orders of magnitude cheaper and more scalable than Nigeria's OPEN initiative. Finding RR to be scientifically replicable to this alternative coding valuably strengthens the possibility others can follow such approaches.

2.2   Descriptive Evidence: Projects and Output

Figure 1 describes bureaucratic output in Nigeria and Ghana: each bar corresponds to a project type, and within-bar colors signify projects conducted by a given organization. For Nigeria, Figure 1-N shows most project types are implemented by multiple organizations. For example,

18 civil service organizations construct boreholes. Figure 1-G shows this lack of specialization is also a feature of the Ghanaian civil service. In Ghana, as in Nigeria, multiple bureaucracies are observed implementing similar infrastructure projects.[3] In both settings: (i) the same project type is implemented by multiple organizations; (ii) each organization is tasked to implement multiple project types. We thus exploit a research design that measures the partial correlation of management practices with public service delivery *within* project type, namely, conditioning on project fixed effects and so accounting for any unobserved heterogeneity in bureaucracies arising from the composition of projects they are tasked to undertake. If project types vary in the optimal set of management practices [Wilson 1989], this lack of specialization leaves more scope for management practices to matter on the margin even conditional on project fixed effects.

Table 2 shows how bureaucratic output varies by project type. In Nigeria, 38% of projects are never started (i.e. have a completion rate of zero); 31% are fully completed. In Ghana, 21% of projects are never started (i.e. are recorded as a one on the scoring card); 34% are fully completed. In both settings the variation on the extensive margins of project completion varies by project type. In Nigeria, infrastructure projects are more likely never to be initiated than non-infrastructure projects. So for example, while 11% of research projects are not initiated, this rises to 79% for small-scale dams. In Ghana there is also considerable heterogeneity across project types in the extensive margins of completion: for example, procurement projects are more than twice as likely not to be initiated as permits and regulation projects.

Figure 2 focuses on the variation in completion rates across organizations. To quantify this variation we note that the 75th percentile organization has an average completion rate: (i) 189% higher than 25th percentile organization in Nigeria; (ii) 22% higher than 25th percentile organization in Ghana. This variation occurs despite the fact that multiple organizations engage in similar project types, they are assigned hires from the same pool of incoming bureaucrats, and that geographically most are located close to each other in Abuja/Accra.[4] Table A1 presents descriptive evidence on the public service delivery of the ten civil service organizations that implement the most projects, by country. This reiterates there is huge variation across organizations in their measured effectiveness. These statistics all suggest there might be important organizational factors correlating with this variation in effective public service delivery. Our focus is on one such factor: the management practices the middle-tier of civil service bureaucrats operate under.

2.3   Management

In both contexts, we follow BVSR's approach to measuring management practices, adapting their survey tool to public sector settings. The Appendix details the exact approach followed in each

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[3]For example, boreholes are implemented by the Ministry of Water Resources, the Department for Urban Roads, the Ministry of Roads and Highways and the Ministry of Environment, Science, Technology and Innovation.

[4]As we use the minimum and maximum of reports for the extensive margin of project output, it is possible that the percentage of initiated projects is below that for completed projects, as occurs in one organization.

bureaucracy. In each case, we measure three dimensions of management practice: those capturing bureaucrats' autonomy/flexibility (CS-autonomy), those capturing incentives and monitoring for bureaucrats (CS-incentives/monitoring), and a composite measure of other practices (CS-other). Each index is converted into a z-score (so are continuous variables with mean zero and variance one by construction), where both are increasing in the commonly understood notion of 'better management'. For the CS-autonomy index, we assume greater autonomy corresponds to better management practices, and similarly for the CS-incentives/monitoring measure.

In Nigeria, practices were elicited from senior management in each organization. While each manager filled in their own questionnaire, our enumerators looked for a consensus and recorded that in their own questionnaire. This consensus is the information used to construct management practice indices for each organization.

In Ghana, the methodological innovations trialed are twofold. First, comparing Tables A2-N and A2-G reveals conceptual differences in the wording and scoring of questions measuring practices. Second, we elicited practices in *individual* surveys administered to bureaucrats. The surveys covered those in managerial roles, as well as bureaucrats being managed. We can reconstruct management practices based on only the most senior bureaucrat in an organization, the group of most senior bureaucrats, or as elicited from lower-tier bureaucrats being managed. We thus examine the robustness of any relationship between bureaucratic effectiveness and management practices to top-down and bottom-up views of practices, so contributing to the wider study of management in organizations. The measure of Ghanaian management practices we use for our core analysis averages management scores over the most senior divisional-bureaucrat reports. The median number of senior managers per organization is 8, close to the number of bureaucrats from whom practices were elicited in Nigeria.

2.4   Descriptive Evidence: Management

Figure 3 shows the across-organization variation in management practices. As with bureaucratic performance, there is high variation in practices across organizations. For those related to the provision of autonomy to bureaucrats, the 75th percentile organization has a CS-autonomy score that is: (i) 49% higher than 25th percentile organization in Nigeria; (ii) 145% higher than 25th percentile organization in Ghana. On management practices related to incentives/monitoring, the 75th percentile organization has a CS-incentives/monitoring score that is: (i) 74% higher than 25th percentile organization in Nigeria; (ii) 97% higher than 25th percentile organization in Ghana. Again, this variation occurs despite the fact that all organizations in each country share the same colonial and post-colonial histories, are governed by the same civil service laws and regulations, are overseen by the same supervising authorities, are assigned new hires from the same pool of incoming bureaucrats each year, and many are located proximately to each other.

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3 Empirical Method and Results

3.1 Method

The unit of observation is project i of type j in organization n. We estimate the following OLS specification,

$$y_{ijn} = \gamma_1 CS\text{-}autonomy_n + \gamma_2 CS\text{-}incentives/monitoring_n + \gamma_3 CS\text{-}other_n + \beta_1 PC_{ijn} + \beta_2 OC_n + \lambda_j + \epsilon_{ijn}.$$
(1)

where y_{ijn} is the project completion rate (or on the extensive margin, an indicator of whether the project is initiated, or fully completed). Management practices are measured using the CS-autonomy, CS-incentives/monitoring and CS-other indices, PC_{ijn} and OC_n are project and organizational controls.[5] As Figure 1 highlighted, many organizations implement the same project type j, so we can control for project type fixed effects λ_j in (1). The partial correlations of interest are γ_1 and γ_2, the effect size of a one standard deviation change in management practices along the respective margins of autonomy and incentives/monitoring. To account for unobserved shocks, we cluster standard errors by project type-organization (jn).

3.2 Scientific Replication: Main Results

Table 3 presents the core results of our scientific replication. Columns 1 to 3 refer to Nigeria; Columns 4 to 6 refer to Ghana. A common set of results emerge across contexts: (i) CS-autonomy is robustly positively correlated with project initiation, full completion and completion rates; (ii) CS-incentives/monitoring is robustly negatively correlated with project initiation, full completion and completion rates in both settings. Moreover, the estimates show similar effect sizes of both dimensions of management practice on the initiation and full completion margins, in which the two settings are most comparable. For project initiation (Columns 1 and 4), in Nigeria, a one standard deviation increase in CS-autonomy increases the likelihood a project is initiated by

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[5]In Nigeria, the project controls include the project budget, whether the project is new or a rehabilitation, and a measure of project complexity (detailed in RR). In Ghana, they include whether the project is regularly implemented or a one-off, whether it requires specific technical skills, and whether the division has to coordinate with actors external to government to implement the project. For the organizational controls, in Nigeria, these include the logs of number of employees, total budget, and capital budget. In Ghana these include the number of bureaucrats interviewed for our survey (which approximates the total number of employees). In both settings we control for the share of bureaucrats with any degree, and the share of postgraduates. In Ghana, we further control for sector fixed effect, relating to whether the project is in the administration, environment, finance, infrastructure, security/diplomacy/justice or social sector. Following BVSR, in both settings we condition on 'noise' controls related to the management surveys. In Nigeria, these noise controls included four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. In Ghana they include averages of indicators of the seniority, gender, and tenure of respondents, the average time of day the interview was conducted and of the reliability of the information as coded by the interviewer.

15%; in Ghana the comparable effect size is 20%. In Nigeria, a one standard deviation increase in CS-incentives/monitoring decreases the likelihood a project is initiated by 16%; in Ghana the comparable effect size is 8%. For project completion (Columns 2 and 5), in Nigeria, a one standard deviation increase in CS-autonomy increases the likelihood a project is completed by 16%; in Ghana the comparable effect size is 27%. In Nigeria, a one standard deviation increase in CS-incentives/monitoring decreases the likelihood a project is completed by 10%; in Ghana the comparable effect size is 12%. Recall the backdrop here is that in Nigeria, 38% of projects are never started; in Ghana, 21% of projects are never started.

These findings suggest the main results from Nigeria are scientifically replicable in the Ghanaian context. In both settings, management practices for bureaucrats matter and are of economic significance. The findings confirm the two dimensions of management practice emphasized by the public administration and economics literatures do indeed robustly correlate to effective public service delivery. The positive correlation of CS-autonomy with project completion rates supports the notion bureaucracies could delegate some decision making to civil servants, relying on their professionalism and resolve to deliver public services. The evidence is less supportive of the notion that when bureaucrats have more agency, they are more likely to pursue their own, potentially corrupt, objectives that diverge from societal interests.[6]

The *negative* partial correlation between project completion rates and management practices related to the provision of incentives and monitoring of bureaucrats, is surprising and counter to evidence from private sector settings. As described earlier, evidence on the impacts of performance-related incentives in *public* sector settings is mixed (often focusing on the impacts of specific compensation schemes to frontline workers). Ours is among the first evidence to suggest the possibility that such management practices negatively correlate to the output of the vital tier of civil service *bureaucrats* in multiple contexts. We return to the issue below.[7]

3.3 Alternative Measures of Management Practice

We probe further whether the replication result is robust to alternative measures of management practice. In the Ghanaian context we can construct top-down versus bottom-up views of management practices, an underexplored element of the BVSR approach to measuring management. The results are in Table 4, where for parsimony we focus on full completion. Column 1 repeats the baseline specification from Column 5, Table 3 where we construct management practice scores based on the set of most senior divisional-bureaucrats. Column 2 shows the findings to be ro-

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[6]Given the management practices are positively correlated to each other in both settings, this also implies that a traditional economics focus of only studying incentives/monitoring would lead $\widehat{\gamma}_2$ to be biased upwards if a measure for CS-autonomy was omitted, and similar biases arise from a traditional public administration perspective that might only focus on the provision of autonomy.

[7]Recent Cochrane reviews have come to different conclusions on the efficacy of pay for performance [Flodgren *et al.* 2011, Scott *et al.* 2011]. Perry *et al.* [2009] and Hasnain *et al.* [2012] also provide meta analysis of the literature and argue there is insufficient evidence of the impact of incentives on bureaucrats.

bust to constructing management practice scores from all senior bureaucrats in the organization, while Column 3 shows them to be weaker if bottom-up views of management are used. Column 4 constructs management scores based on all bureaucrats and these largely qualitatively and quantitatively replicate the baseline findings.

These results open interesting new avenues for research, highlighting that: (i) in terms of top-down views of management, it might be preferable to use a small number of individual surveys of senior managers to construct such information if it is more cost effective than the consensual approach we followed in Nigeria; (ii) there remains scope for research to understand why bottom-up views of management do not coincide with top-down views, and whether organizational discord measured this way might capture important elements of organizational functioning and be predictive of their performance.

3.4   Heterogeneity

Given the importance of the finding of a robust *negative* partial correlation across contexts between project completion rates and management practices related to incentives/monitoring of bureaucrats, we follow RR and investigate the result in more detail by examining how heterogeneous the impacts of such practices are. We focus on two dimensions of heterogeneity that can be comparably measured across settings, relating to bureaucrat characteristics elicited in our survey of civil servants in each setting. The two hypotheses we are able to explore are whether the negative partial correlation of CS-incentives/monitoring varies with: (i) the average tenure of bureaucrats; (ii) bureaucrats' perceptions of corruption in their organization.[8]

Table 5 shows the results for both extensive margin outcomes where interactions are in deviation from means. On tenure we find: (i) in both settings, the negative impact of CS-incentives/monitoring on project initiation and full completion becomes *more negative* with bureaucratic tenure: this is in line with bureaucrats learning to game outcomes over time. On corruption, the results vary across settings. In Nigeria, there is some evidence that autonomy helps offset corruption for project initiation. In Ghana, there is less evidence that perceptions of corruption, on the margin, interact with management practices in place for middle-tier civil servants. This certainly leaves scope for future work to probe further what might drive such differences across civil service settings.

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[8]Tenure is years in service. The observation of corrupt practices measure is an organization-level average of the proportion of projects officials at an organization stating, 'I observed others breaking the service rules for their own benefit' in our individual surveys. In Nigeria, we fielded our civil servant survey to a representative sample of 4100 civil servants, corresponding to 13% of the total workforce of the 63 organizations we study. This asked bureaucrats about their tenure, employment history, intrinsic motivation, and perceptions of organizational corruption. In Ghana our survey covered 2874 civil servants, corresponding to the universe of senior (i.e. professional) staff in the 31 organizations we study.

4 Discussion

This paper is among the first scientific replications of a study on the correlates of bureaucratic functioning in developing country contexts.[9] Replicating findings in this nascent literature is valuable because: (i) each individual study is nearly always limited to a small number of bureaucratic organizations, especially when examining middle-tier civil servants working in central ministries; (ii) establishing robust findings across similar contexts underpins the external validity of any given study, and so moves the knowledge frontier closer to establishing stylized facts; (iii) scientifically replicating findings using alternative methodologies/measurement tools helps researchers collect data more cost-effectively; and (iv) where differences in results have emerged, this helps focus researchers' future attention on such sources of heterogeneity across contexts.

Given the growing recognition that bureaucrats and bureaucracies play in determining state capability, it will be important for researchers to understand similarities and differences across such state organizations in order to advance the literature. Bureaucracies differ in terms of their selection and retention policies for bureaucrats [Dal Bo *et al.* 2013], and mechanisms for the public and politicians to hold public sector organizations accountable [Olken 2007, Bjorkman and Svensson 2009]. Building on the literature examining cross-country differences in bureaucratic effectiveness, our analysis pushes forward the frontier to understand within-country variation in effectiveness, and highlighting the role that management plays in driving pockets of good governance within the same structure of political institutions in relatively weak states [Leonard 2010]. We hope our work is the first of many to help establish a picture of what findings on bureaucratic effectiveness replicate over settings and what the sources of within-country heterogeneity driving effectiveness might be.

Our findings have several implications for approaches to bureaucratic reform in Ghana, Nigeria, and elsewhere. While the overwhelming emphasis of civil service reforms in past decades has been on the introduction of performance management systems and trying to mimic private sector incentives, our results suggest that this emphasis may be misguided – or at least incomplete. Instead, there seems to be a benefit to finding ways to support the autonomy and professionalism of civil servants, both in terms of specific management practices (e.g. making sure individuals understand their role in the organization and how it connects to that of their colleagues) as well as in terms of fostering organizational cultures of flexibility and innovation. Emphasizing discretion and flexibility rather than hierarchy or incentives can encourage bottom-up changes and reforms. Importantly, we find no evidence that giving civil servants autonomy is associated with greater corruption or decreased productivity – if anything, the reverse seems to be true.

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[9]We are obviously aware that it is ideal to have independent replication. However, concerns over motives of replicators remains even with independence [Christensen.and Miguel 2016].

5　Appendix

5.1　Measuring Bureaucracy Projects and Output

5.1.1　Nigeria

In 2006/7 the Nigerian Government undertook the Overview of Public Expenditure in NEEDS (the 'OPEN initiative'), in which it traced, by project, the use and impact of a representative sample of 10% of federal social sector expenditures approved in 2006/7. Under the OPEN initiative, expert teams visited projects to record their implementation. This monitoring process was independent of civil servants: projects were evaluated by teams of independent engineers and civil society.

A system of checks and balances were further put in place to underpin the credibility of the initiative. First, a centralized team of technocrats monitored the evaluation teams, providing them with training and opportunities for standardization of their methods. Second, evaluators were asked to provide material/photographic/video evidence to support their reports. Third, random checks were performed on evaluated sites. Evaluations of the OPEN initiative indicate it was successful [Eboh 2010].

Monitoring teams visited project sites 18 months after projects were approved. The projects we study have 12 month completion schedules, so even accounting for any delay in fund disbursement, it remains feasible for these projects to be completed by the time of the monitoring survey. We hand-coded the material from all projects recorded in OPEN initiative reports from 63 federal civil service organizations, covering 4721 projects with an aggregate budget of US$800 million. 11 project types are covered (road, borehole, training etc.) with boreholes being the modal project type, and 75% of projects relating to small-scale infrastructure.

The main outcome we use is a *continuous* zero to one measure coded by monitoring teams of each project's completion rate. A completion rate of zero implies inspectors found no hard evidence of the project being attempted. A completion rate of one implies the project matched its full technical specification.

5.1.2　Ghana

In Ghana each civil service organization is required to provide quarterly and annual progress reports. These detail targets and achievements for individual projects. Figure A1-G shows a typical quarterly report. For each progress report, we codify project line items using a team of trained research assistants and a team of civil servant officers seconded from the Management Services Department in the Civil Service. These coders were tasked to record project completion on a simple 1-5 scoring grid, where a score of one corresponds to, "No action was taken towards achieving the target", three corresponds to, "Some substantive progress was made towards achieving the target. The output is partially complete and/or important intermediate steps have been completed", and a score of five corresponds to, "The target for the output has been reached or surpassed." Projects

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can be long-term or repeat projects. There are at least two coders per project. Given the tendency for mean reversion in average scores, we use the maximum and minimum scores to code whether projects are fully complete/never initiated respectively.

Progress reports are self-compiled by bureaucracies. A concern is that progress is measured with systematic error: low performing bureaucracies might intentionally manipulate their reports to hide the fact. To check the validity of progress reports, we matched a sub-sample of 14% of projects from progress reports to project audits conducted by external auditors. Auditors are mostly retired civil servants, overseen by Office of the Head of Civil Service, and they obtain documentary proof of project completion. For matched projects, 94% of the completion levels we code are corroborated based on the qualitative descriptions of completion in audits.[10]

5.2 Measuring Management Practices

5.2.1 Nigeria

We follow BVSR's approach to measuring management practices, adapting their survey tool to the Nigerian public sector setting. As detailed in RR, management practices were elicited from senior management in each organization. While each manager filled in their own questionnaire, our enumerators looked for a consensus and recorded that in their own questionnaire. This is the information used to construct management practice indices for each organization.

From September to November 2010, our enumerators held 'double blind' interviews in the 63 organizations we record project completion rates for. Our management survey covers nine topics: roles, flexibility, incentives, monitoring, culture, targeting, facilities, skills and staffing. Table A2-N details the questions under each topic area. We combine answers to the roles and flexibility questions to construct an index of management practices capturing bureaucrats' 'autonomy' (CS-autonomy). We combine answers on the incentives and monitoring topic areas to construct an index capturing the 'incentives/monitoring' management practices bureaucrats operate under (CS-incentives/monitoring). We combine answers on all remaining topics to construct an 'other' management practices index (CS-other).[11]

The responses to each practice are converted into normalized z-scores by taking unweighted means of the underlying z-scores (so are continuous variables with mean zero and variance one by construction), where both are increasing in the commonly understood notion of 'better management'. The CS-autonomy and CS-incentives/monitoring management scores are *positively* correlated (correlation coefficient .24). However, these correlations are not so high to prevent precise

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[10]Among the handful of non-corroborated projects, the lowest "true" completion rate was a 3, indicating that the rare instances of misreporting were relatively minor.

[11]There is no definitive way to solicit management practices along these various dimensions, nor a definitive way to collate them into aggregate indices. Our approach is primarily designed to reflect two broad areas of management practice emphasized in the public administration and economics literatures as being first order determinants of bureaucrats' behavior: autonomy and incentives/monitoring. The issue is discussed extensively in RR.

estimation of the partial correlation of each measure to public service delivery.[12]

5.2.2 Ghana

We adapted BSVR's methodology to six topic areas overlapping with those used in Nigeria: roles, flexibility, incentives, monitoring, staffing and targeting. Table A2-G details the questions under each topic area. The roles and flexibility scores are combined to produce a CS-autonomy z-score measure, the incentives and monitoring scores are combined to produce a CS-incentives/monitoring measure. The staffing and targeting scores are combined into CS-other. The measure of management practices we use for our core analysis averages management scores over the most senior divisional-bureaucrat reports.[13]

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[12]Substitution between practices could occur if bureaucrats have career concerns, and so performance incentives are not required once autonomy is provided. Alternatively, if bureaucrats are intrinsically motivated they might need only to be provided autonomy, and the provision of explicit incentives might crowd out their intrinsic motivation. The marginal impacts of these two measures can also be separately identified from the CS-other index: the CS-autonomy (CS-incentives/monitoring) index has a correlation of .17 (.43) with the CS-other measure.

[13]In Ghana the management scores are more highly correlated than in Nigeria ($\rho_G = .72$). The partial correlations of these dimensions of management can still be separately estimated from each other and from the CS-other index. The CS-autonomy (CS-incentives/monitoring) index has a correlation of .59 (.70) with CS-other.

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Figure 1-N: Project Types by Implementing Organization, Nigeria
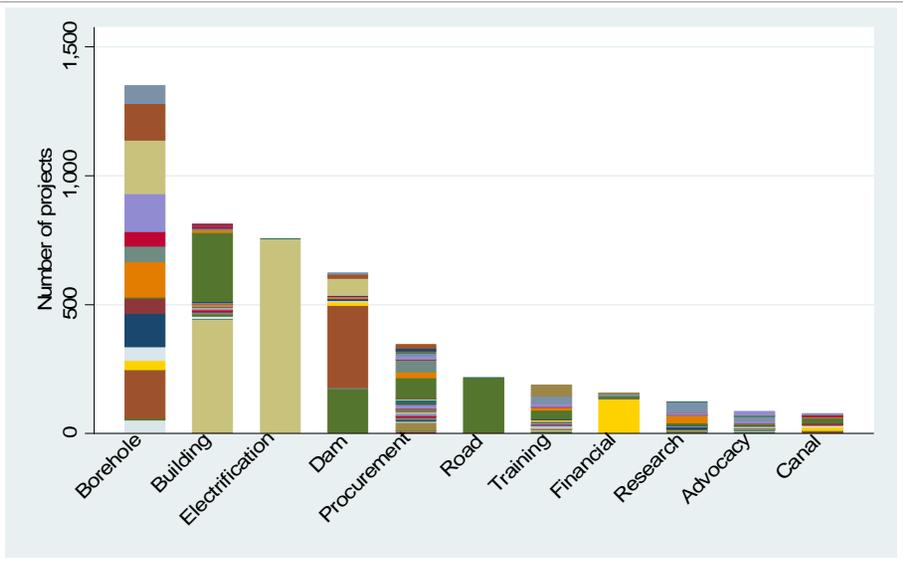
Figure 1-G: Project Types by Implementing Organization, Ghana
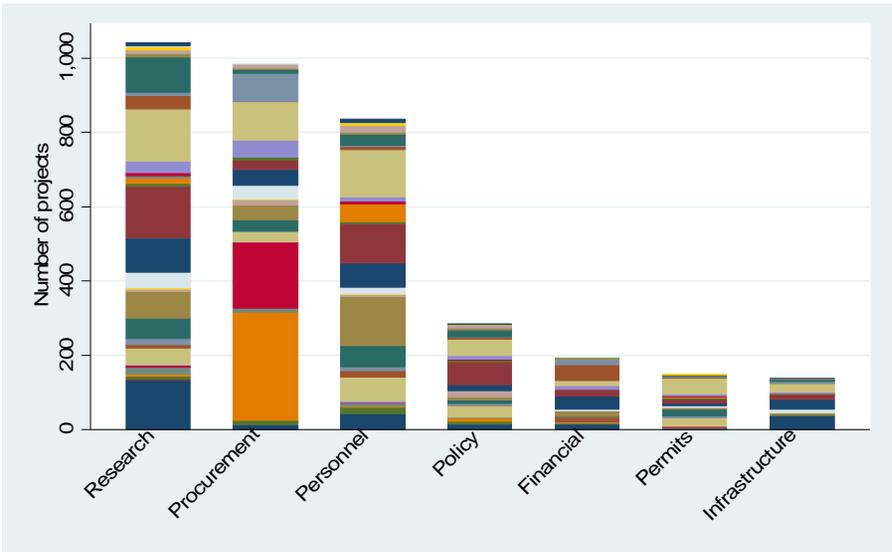
Notes: The "project type" classification refers to the primary classification for each project. Other project classifications exist. Each colour in a column represents an organization implementing projects of that project type, but the same colour across columns may represent multiple organizations.

Figure 2: Bureaucratic Performance by Organization
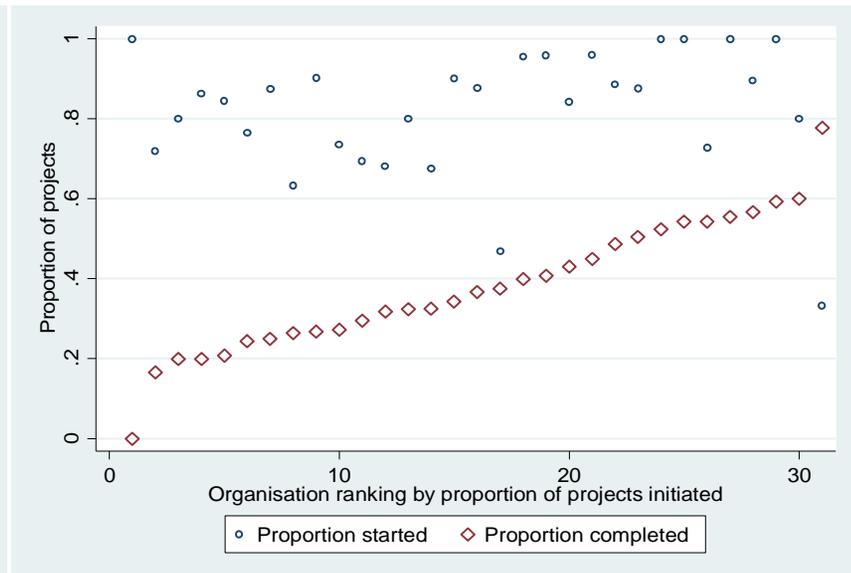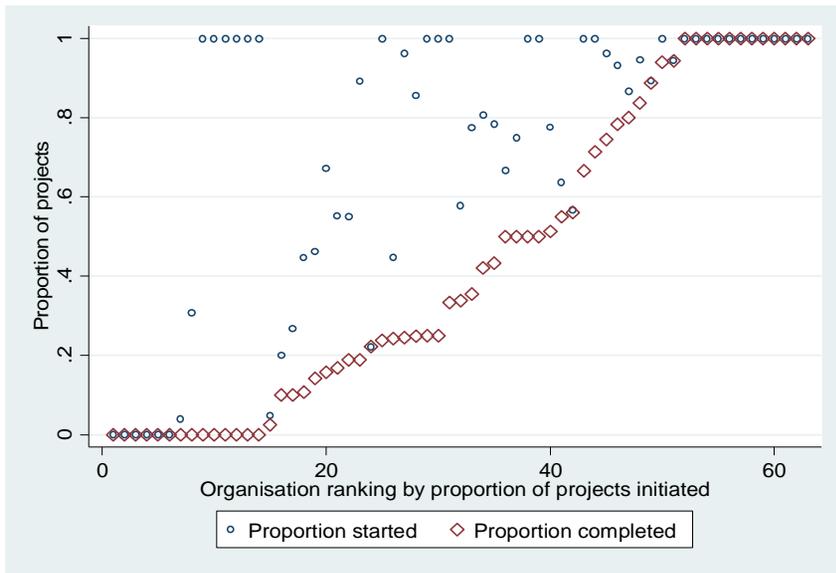
Notes: In Nigeria there was a single assessment of the completion status of a project. In Ghana, multiple coders assessed a project such that here we take the minimum assessment of initiation and the maximum assessment of completion.

Figure 3: Management Practices Across Bureaucracies

A. CS-Autonomy Scores
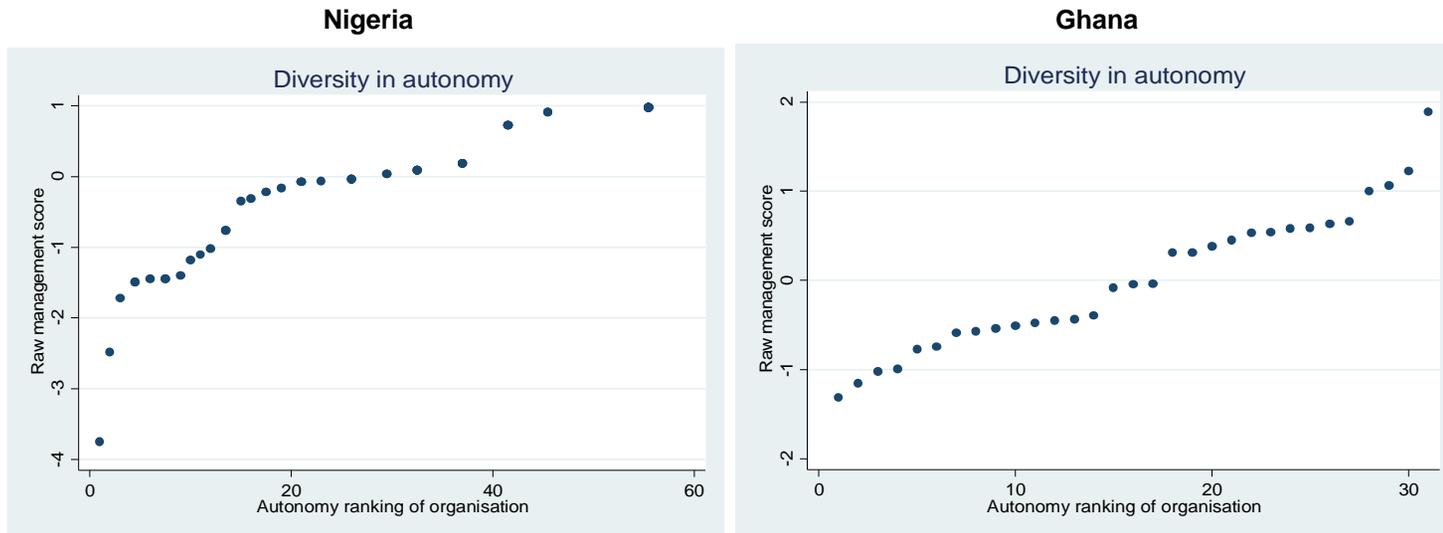
Nigeria

Ghana

B. CS-Incentives/Monitoring Scores
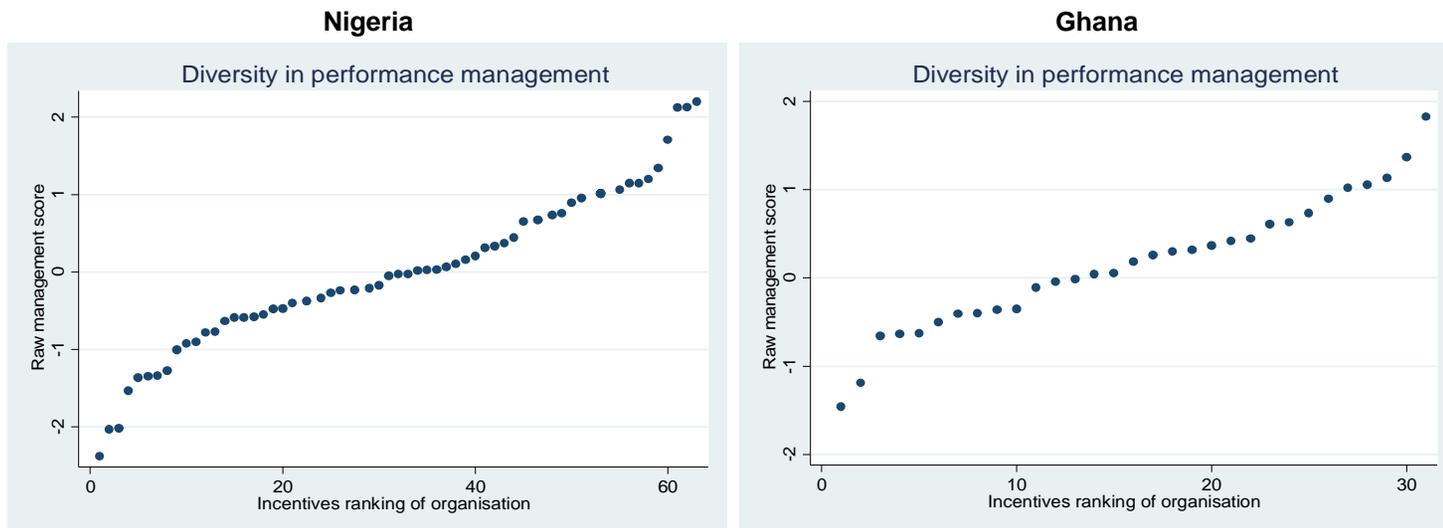
Nigeria

Ghana

Notes: Though both aimed to reflect the World Management Survey topics, many of the questions asked in Nigeria and Ghana differed. In Nigeria, response possibilities varied depending on the question. In Ghana, the responses followed the World Management Survey 1 to 5 scoring grid categorization. Responses are therefore converted into z-scores and averaged to a single index of management, without further standardization. In both countries, we only exhibit scores for those organizations for which we have output data.

Table 1: National and Bureaucrat Characteristics

	Nigeria	Ghana
National Characteristics		
Wage bill (% government expenditure)	0.29	0.29
WGI Government Effectiveness Score	17	45
Transparency International Corruption Perception: Public Officials/Civil Servants	69	59
Bureaucrat Characteristics		
Span of control	1.49	4.52
Proportion female	0.65	0.45
Proportion with any graduate degree	0.80	0.70
Proportion with postgraduate degree	0.27	0.31
Years in service	16.1	14.3
Years at current bureaucratic organization	12.7	8.7

Notes: The figures are averages of organization averages. Wage bill figures are drawn from the World Bank's 'Government Wage Bill and Employment' data set and associated (unpublished) analysis. The Government Effectiveness Score is taken from the Worldwide Governance Indicators, 2016 Update. The number shown is the country's percentile rank among all countries (ranges from 0 (worse) to 100 (better)) on an index that "Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies." Transparency International's corruption perception indicator is the percentage of people surveyed in a country that believe public officials/civil servants are 'corrupt or extremely corrupt'. Figures rounded to two significant figures where relevant.

Table 2: Variation in Bureaucratic Performance by Project Types

A. Nigeria

Project Type	(1) Number of Projects [Proportion]	(2) Number of Implementing Organizations	(3) Proportion Never Started	(4) Proportion Fully Completed	(5) Completion Rate [0-1]
All Project Types	4,721 [1.00]	**63**	0.38	0.31	0.46
Physical infrastructure	3,822 [0.81]	**45**	0.41	0.28	0.44
All non-Physical Infrastructure Projects	899 [0.19]	**49**	0.26	0.44	0.58
Borehole	1348 [0.29]	**18**	0.44	0.37	0.47
Building	806 [0.17]	**32**	0.37	0.34	0.50
Electrification	751 [0.16]	**2**	0.14	0.25	0.56
Dam	624 [0.13]	**14**	0.79	0.10	0.15
Procurement	345 [0.07]	**41**	0.30	0.47	0.58
Road	217 [0.05]	**4**	0.12	0.22	0.52
Training	189 [0.04]	**26**	0.20	0.42	0.60
Financial project	157 [0.03]	**8**	0.38	0.35	0.49
Research	122 [0.03]	**21**	0.11	0.52	0.63
Advocacy	86 [0.02]	**23**	0.24	0.47	0.61
Canal	76 [0.02]	**12**	0.70	0.05	0.14

B. Ghana

Project Type	(1) Number of Projects [Proportion]	(2) Number of Implementing Organizations	(3) Proportion Never Started (Min Report)	(4) Proportion Fully Completed (Max Report)	(5) Completion Rate [1-5]
All Project Types	3,628 [1.00]	**31**	0.21	0.34	3.23
Physical infrastructure	985 [0.27]	**24**	0.17	0.28	3.20
All non-Physical Infrastructure Projects	2643 [0.73]	**31**	0.23	0.37	3.24
Advocacy and Policy Development	836 [0.23]	**30**	0.23	0.34	3.20
Financial & Budget Management	138 [0.04]	**19**	0.27	0.44	3.29
ICT Management and Research	284 [0.08]	**26**	0.18	0.35	3.23
Monitoring, Training and Personnel Management	1,042 [0.29]	**31**	0.23	0.40	3.30
Permits and Regulation	149 [0.04]	**22**	0.14	0.32	3.28
Procurement	194 [0.05]	**22**	0.31	0.36	3.02

Notes: The "project type" classification refers to the primary classification for each project. Other project classifications exist. 'Completion Rate' is a continuous variable that takes values between 0 and 1. The 'Average Completion Rate' is a categorical variable taking the value 1 if the project was not started and 5 if it was fully completed. It is accompanied in Column 5 by the coefficient of variation. The 'Proportion Never Started' and 'Proportion Fully Completed' columns are based on dummies that take the corresponding values of the completion status variable. The corresponding columns with minimum and maximum reports take the lowest and highest reports by project assessors respectively. Figures are rounded to two decimal places where relevant.

Table 3: Management of Bureaucrats and Public Service Delivery

Standard Errors: Clustered by Project Type Within Organization

OLS Estimates

	Nigeria			Ghana		
	(1) Initiation	**(2) Full Completion**	**(3) Completion Rate**	**(4) Initiation**	**(5) Full Completion**	**(6) Completion Rate**
CS-Autonomy	0.15***	0.16***	0.18***	0.20***	0.27***	0.16***
	(0.03)	(0.02)	(0.03)	(0.05)	(0.06)	(0.03)
CS-Incentives/Monitoring	-0.16***	-0.10***	-0.14***	-0.08*	-0.12***	-0.08***
	(0.02)	(0.02)	(0.02)	(0.04)	(0.05)	(0.02)
CS-Other	0.06**	0.06**	0.08***	-0.10**	-0.06	-0.03
	(0.03)	(0.03)	(0.02)	(0.04)	(0.04)	(0.02)
Organization Controls (capital, general, noise)	Yes	Yes	Yes	Yes	Yes	Yes
Project Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type
Observations (clusters)	4721 (201)	4721 (201)	4721 (201)	3628 (174)	3628 (174)	3628 (174)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses, and are clustered by project type within organization throughout. All columns report OLS estimates. The dependent variable in Columns 1 and 4 is a dummy variable that takes the value 1 if the project is initiated and 0 otherwise. The dependent variable in Columns 2 and 5 is a dummy variable that takes the value 1 if the project is completed and 0 otherwise. The dependent variable in Columns 3 and 6 is an index of project completion (that is a continuous measure between zero and one). In Nigeria, Project Type fixed effects relate to whether the primary classification of the project is as a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. In Ghana, Project Type fixed effects relate to whether the primary classification of the project is 'Advocacy and Policy Development', 'Financial & Budget Management', 'ICT Management and Research', 'Monitoring, Training and Personnel Management', 'Physical infrastructure', 'Permits and Regulation' or 'Procurement'. In Ghana, sector fixed effects are also included, and relate to whether the project is in the administration, environment, finance, infrastructure, security/diplomacy/justice or social sector. In Nigeria, project controls comprise project-level controls for the project budget, whether the project is new or a rehabilitation, and an assessment of its aggregate complexity by Nigerian engineers. In Ghana, project controls comprise project-level controls for whether the project is regularly implemented by the organization or a one off, whether the project requires specific technical skills and whether the division has to coordinate with actors external to government to implement the project. In Nigeria, capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. In Ghana, capital controls comprise a count of the number of interviews undertaken, which is a close approximation of the total number of employees. In both countries, general controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. In Nigeria, noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. In Ghana, noise controls are averages of indicators of the seniority, gender, and tenure of all respondents, the average time of day the interview was conducted and of the reliability of the information as coded by the interviewer. Figures are rounded to two decimal places.

Table 4: Top-down and Bottom-up Measures of Management Practices

Dependent Variable: Completion Binary [yes=1]
Standard Errors: Clustered by Project Type Within Organization
OLS Estimates

	Ghana			
	(1) Most Senior Bureaucrats	**(2) All Senior Bureaucrats**	**(3) Non-senior bureaucrats**	**(4) All Respondents**
CS-Autonomy	0.27***	0.28***	0.12*	0.25***
	(0.06)	(0.05)	(0.06)	(0.07)
CS-Incentives/Monitoring	-0.12***	-0.17**	-0.02	-0.14***
	(0.05)	(0.07)	(0.05)	(0.07)
CS-Other	-0.06	-0.08**	-0.04	-0.02
	(0.04)	(0.03)	(0.05)	(0.07)
Organization Controls (capital, general, noise)	Yes	Yes	Yes	Yes
Project Controls	Yes	Yes	Yes	Yes
Fixed Effects	Project Type	Project Type	Project Type	Project Type
Observations (clusters)	3628 (174)	3620 (171)	3628 (174)	3628 (174)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses, and are clustered by project type within organization throughout. All columns report OLS estimates. The dependent variable in all columns is a dummy variable that takes the value 1 if the project is completed and 0 otherwise. The most senior bureaucrat refers to the official of the highest grade that we interviewed within a division. All senior bureaucrats refers to that set of individuals who identify themselves as Director (Head of Division) or Acting Director, or Deputy Director or Unit Head (Acting or Substantive). Non-senior bureaucrats are those officials who do not identify themselves as senior bureaucrats. Project Type fixed effects relate to whether the primary classification of the project is 'Advocacy and Policy Development', 'Financial & Budget Management', 'ICT Management and Research', 'Monitoring, Training and Personnel Management', 'Physical infrastructure', 'Permits and Regulation' or 'Procurement'. Sector fixed effects relate to whether the project is in the administration, environment, finance, infrastructure, security/diplomacy/justice or social sector. Project controls comprise project-level controls for whether the project is regularly implemented by the organization or a one off, whether the project requires specific technical skills and whether the division has to coordinate with actors external to government to implement the project. Capital controls comprise a count of the number of interviews undertaken, which is a close approximation of the total number of employees. General controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. Noise controls are averages of indicators of the seniority, gender, and tenure of all respondents, the average time of day the interview was conducted and of the reliability of the information as coded by the interviewer. Figures are rounded to two decimal places.

Table 5: Heterogeneous Partial Correlations of Management Practices

Standard Errors: Clustered by Project Type Within Organization

Interactions in Deviation from Mean

OLS Estimates

| | Initiation | | | | Full Completion | | | |
| | Nigeria | | Ghana | | Nigeria | | Ghana | |
	(1) Tenure	(2) Corruption	(3) Tenure	(4) Corruption	(5) Tenure	(6) Corruption	(7) Tenure	(8) Corruption
CS-Autonomy	0.13***	0.14***	0.21***	0.21***	0.17***	0.14***	0.27***	0.29***
	(0.03)	(0.03)	(0.05)	(0.08)	(0.02)	(0.03)	(0.05)	(0.08)
CS-Incentives/Monitoring	-0.08**	-0.19***	-0.10**	-0.02	-0.03	-0.13***	-0.11*	-0.17***
	(0.03)	(0.03)	(0.04)	(0.05)	(0.03)	(0.03)	(0.05)	(0.06)
CS-Other	0.03	0.07***	-0.10**	-0.08*	0.02	0.03	-0.08	-0.06
	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.03)	(0.05)	(0.04)
CS-Autonomy x Average Tenure of Bureaucrats	0.01***		0.01		0.01		0.02*	
	(0.004)		(0.01)		(0.00)		(0.01)	
CS-Incentives/Monitoring x Average Tenure of Bureaucrats	-0.02***		-0.03**		-0.02***		-0.02	
	(0.01)		(0.01)		(0.01)		(0.02)	
CS-Autonomy x Proportion of Projects that Bureaucrats Report Observing Corrupt Practices On		0.96***		0.00		-0.57*		0.01
		(0.23)		(0.01)		(0.30)		(0.01)
CS-Incentives/Monitoring x Proportion of Projects that Bureaucrats Report Observing Corrupt Practices On		-0.30		-0.01*		0.29		0.00
		(0.27)		(0.01)		(0.33)		(0.01)
Average Tenure of Bureaucrats	-0.02***		0.02**		-0.02***		0.01	
	(0.01)		(0.01)		(0.01)		(0.01)	
Proportion of Projects that Bureaucrats Report Observing Corrupt Practices On		-1.24***		0.01*		-0.83**		-0.01
		(0.37)		(0.01)		(0.40)		(0.01)
Organization Controls (capital, general, noise)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Project Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type	Project Type
Observations (clusters)	4721 (201)	4721 (201)	3628 (174)	3628 (174)	4721 (201)	4721 (201)	3628 (174)	3628 (174)

Notes: *** denotes significance at 1%, ** at 5%, and * at 10% level. Standard errors are in parentheses, and are clustered by project type within organization throughout. All columns report OLS estimates. In Columns 1 through 4, the dependent variable is a dummy variable that takes the value 1 if the project is initiated and 0 otherwise. In Columns 5 through 8, the dependent variable is a dummy variable that takes the value 1 if the project is fully completed and 0 otherwise. In odd columns, tenure is an organization-level average for the number of years officials have worked at the implementing organization. In even columns, observation of corrupt practices is an organization-level average of the proportion of projects officials at an organization stated on which 'I observed others breaking the service rules for their own benefit' in the Civil Servants Survey. In Nigeria, Project Type fixed effects relate to whether the primary classification of the project is as a financial, training, advocacy, procurement, research, electrification, borehole, dam, building, canal or road project. In Ghana, Project Type fixed effects relate to whether the primary classification of the project is 'Advocacy and Policy Development', 'Financial & Budget Management', 'ICT Management and Research', 'Monitoring, Training and Personnel Management', 'Physical infrastructure', 'Permits and Regulation' or 'Procurement'. In Ghana, sector fixed effects are also included, and relate to whether the project is in the administration, environment, finance, infrastructure, security/diplomacy/justice or social sector. In Nigeria, project controls comprise project-level controls for the project budget, whether the project is new or a rehabilitation, and an assessment of its aggregate complexity by Nigerian engineers. In Ghana, project controls comprise project-level controls for whether the project is regularly implemented by the organization or a one off, whether the project requires specific technical skills and whether the division has to coordinate with actors external to government to implement the project. In Nigeria, capital controls comprise organization-level controls for the logs of number of employees, total budget, and capital budget. In Ghana, capital controls comprise a count of the number of interviews undertaken, which is a close approximation of the total number of employees. In both countries, general controls comprise organization-level controls for the share of the workforce with degrees, and the share of the workforce with postgraduate qualifications. In Nigeria, noise controls are four interviewer dummies, indicators of the seniority, gender, and tenure of the managers who responded, the day of the week the interview was conducted, the time of day the interview was conducted, a dummy variable indicating whether the interview was conducted during Ramadan, the duration of the interview, and an indicator of the reliability of the information as coded by the interviewer. In Ghana, noise controls are averages of indicators of the seniority, gender, and tenure of all respondents, the average time of day the interview was conducted and of the reliability of the information as coded by the interviewer. Figures are rounded to two decimal places.

Figure A1-G: Quarterly Report, an Example

PROGRAMMED ACTIVITIES	BUDGET PERFORMANCE	EXPECTED OUTPUT/IMPACT	ACTUAL OUTPUT	REMARKS
MANAGEMENT AND ADMINISTRATION				
ADMINISTRATION				
LEGAL DIVISION				
Output 1:Competition Policy Developed and Approved				
1. Develop Draft Competition Policy		Draft Competition Policy developed	Evaluation of technical proposals completed. Two firms have been shortlisted. The two firms have been invited to present financial proposals.	Procurement process is still on-going and expected to be completed by end of Quarter 3.
2. Organize stakeholder meeting to validate draft Competition Policy		Stakeholder meeting held	Yet to be done	
3. Prepare Cabinet Memo and submit Competition Policy to Cabinet for approval		Competition Policy submitted to Cabinet	Work on the bill is still frozen due to on-going work on the policy	
Output 2: Competition Bill prepared and approved				
1. Review the Draft Competition Bill taking into		The draft bill reviewed	Yet to be done	Work on the bill will begin after the Policy has been

Figure A2-G: What Do Bureaucracies Do?
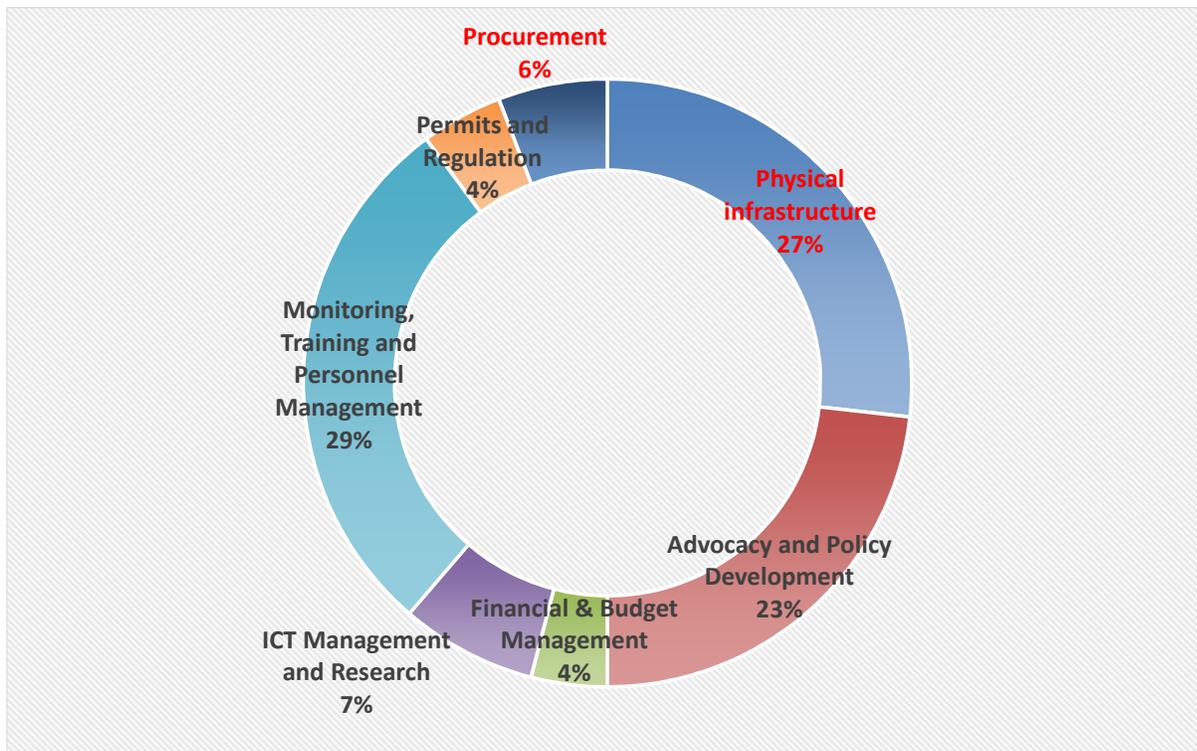
Notes: Multiple coders made assessments of the category under which an activity fell, and a manager created a consensus where necessary.

Table A1: Variation in Bureaucratic Performance by Largest Civil Service Organizations

A. Nigeria

Civil Service Organization	(1) Number of Projects	(2) Number of Unique Project Types	(3) Proportion Never Started	(4) Proportion Fully Completed	(5) Completion Rate [0-1]
All Organizations (Average)	75	4.19	0.27	0.44	0.59
Federal Ministry of Agriculture and Rural Development	797	9	0.54	0.14	0.29
Federal Ministry of Power and Steel	750	1	0.14	0.25	0.56
Federal Ministry of Water Resources	520	4	0.95	0.03	0.04
National Primary Health Care Development	447	4	0.19	0.42	0.64
Sokoto Rima River Basin Development Authority	277	2	0.22	0.51	0.66
Upper Benue River Basin Development Authority	169	3	0.11	0.89	0.89
Ogun/Oshun River Basin Development Authority	165	4	0.55	0.24	0.32
Chad Basin River Basin Development Authority	148	3	0.43	0.56	0.56
Lower Benue River Basin Development Authority	143	3	0.45	0.17	0.42
Nigerian Agricultural Cooperative and Rural Development Bank	133	2	0.42	0.34	0.46

B. Ghana

Civil Service Organizations [Sector]	(1) Number of Projects	(2) Number of Unique Project Types	(3) Proportion Never Started	(4) Proportion Fully Completed (Max Report)	(5) Average Completion Rate [CV]
All Organizations (Average)	117	5.60	0.21	0.34	3.23 [0.38]
Ministry of Trade and Industry	495	7	0.26	0.27	2.97 [0.4]
Ministry of Finance	374	7	0.37	0.26	2.75 [0.5]
Department of Feeder Roads	315	6	0.20	0.32	3.2 [0.42]
Ministry of Energy and Petroleum	285	7	0.31	0.29	2.99 [0.44]
Ministry of Gender, Children and Social Protection	274	7	0.16	0.43	3.51 [0.32]
Controller and Accountant-General's Department	254	7	0.27	0.54	3.49 [0.42]
Environmental Protection Agency	193	6	0.28	0.17	2.86 [0.4]
Department of Urban Roads	188	4	0.15	0.21	3.11 [0.34]
Ministry of Environment, Science, Technology, and Innovation	172	6	0.10	0.34	3.45 [0.23]
Office of the Head of Civil Service	158	7	0.11	0.49	3.87 [0.24]

Notes: The sample covers the ten largest civil service organizations for which we had data on activities ranked by number of projects from our overall sample of projects. 'Completion Rate' is a continuous variable that takes values between 0 and 1. 'All Organizations (Average)' refers to all projects in our sample. The "project type" classification refers to the primary classification for each project. Other project classifications exist. The 'Average Completion Rate' is a categorical variable taking the value 1 if the project was not started and 5 if it was fully completed. It is accompanied in Column 5 by the coefficient of variation. The 'Proportion Never Started' and 'Proportion Fully Completed' columns are based on dummies that take the corresponding values of the completion status variable. The corresponding columns with minimum and maximum reports take the lowest and highest reports by project assessors respectively. Figures are rounded to two decimal places where relevant.

Table A2-N: Defining Management Practices, Nigeria

Management Practice	Topic	Specific Questions Related to this Topic
CS-Autonomy	Roles	Can most staff above SGL 7 in your organization make substantive contributions to the policy formulation and implementation process?
		Can most staff above SGL 15 in your organization make substantive contributions to the policy formulation and implementation process?
		To what extent do the employees in this organization have the ability to determine how they carry out the assignments in their daily work?
	Flexibility	Does your organization make efforts to redefine its standard procedures in response to the specific needs and peculiarities of a community?
		How flexible would you say your organization is in terms of responding to new practices, new techniques, and regulations?
		At your organization, how efficiently is best practice shared between departments?
		Given past experience, how effectively would a conflict within your organization be dealt with?
CS-Incentives/Monitoring	Performance Incentives	Given past experience, how would under-performance be tolerated?
		Given past experience, what happens if there is a part of your organization that isn't achieving agreed results?
		What percentage of *workers* were rewarded when targets were met?
		What percentage of *managers/directors* were rewarded when targets were met?
		Given past experience, are members of this organization disciplined for breaking the Public Service Rules?
		Given past experience, what would most likely happen to a person in this organization who accepted money or a present from someone who came to them with a problem?
	Monitoring	In what kind of ways does your organization track how well it is delivering services?
		If have performance indicators, how often are these indicators collected?
		If have performance indicators, how often are these indicators reviewed by Minister or Permanent Secretary?
		If have performance indicators, how often are these indicators reviewed by non managerial staff?
		Does the organization use performance or quality indicators for tracking the performance of its employees?
		At your organization, how highly regarded is the collection and use of data in planning and implementing projects?
CS-Other	Facilities	During a typical working day (8 hours from 8am to 4pm), how many hours is there electricity (PHCN or generator)?
		Out of the five [5] working days, how many days is the network (GSM) coverage working for 50% of calls or more?
		Out of the five [5] working days, how many hours is their internet access good enough to check e-mail?
		Out of every ten [10] officers above SGL 7, how many have access to a computer (desktop or laptop)?
		Out of every ten [10] officers above SGL 7, how many have access to a vehicle (privately owned or otherwise) that can be used for work?
	Skills	Out of every ten [10] officers above SGL 7, how many can use a computer to write a memo?
		Out of every ten [10] officers above SGL 7, how many can use a computer to create a PowerPoint presentation?
		Out of every ten [10] officers above SGL 7, how many can use a computer to create an Excel spreadsheet?
		On which topics have trainings been performed at your organization in the last five [5] years? Technical trainings.
		On which topics have trainings been performed at your organization in the last five [5] years? Laws and regulations.
		On which topics have trainings been performed at your organization in the last five [5] years? Legal rights of the public.
		On which topics have trainings been performed at your organization in the last five [5] years? Good relations with the public.
		On which topics have trainings been performed at your organization in the last five [5] years? Ethics.
		On which topics have trainings been performed at your organization in the last five [5] years? What to do with presents.
		Out of every ten [10] officers above SGL 7 at your organization, how many have had some form of training over the last five [5] years?
	Staffing	Do you think the most senior staff of your organization talk about attracting and developing talented people?
		Do you think the most senior staff of your organization then actually goes about attracting and developing talented people?
		If two people both joined your organization five years ago and one was much better at their work than the other, would he/she be promoted through the service faster?
		Given past experience, if there is a 'top performing' civil servant, does your organization do their best to keep him/her?
		Is the burden of achieving the organization's targets evenly distributed across its different departments, or do some groups consistently shoulder a greater burden than others?
		How do you feel the number of staff in your organization relates to the activities undertaken there?
		What percentage of staff is doing most of the work at your organization?
		Thinking about all the projects that your organization has been involved in since your appointment here, would you say that senior staff try to use the right staff for the right job?
	Targeting	Does your organization have a clear set of targets derived from its mission and goals?
		How tough are the targets of the organization?
		When you arrive at work each day, do you and your colleagues know what your organization is trying to achieve on that particular day?
	Culture	How effectively would you say your organization is in making the bulk of its staff feel valued?
		To what extent would you say employees of your organization trust each other?
		If you think about the way that employees of this organization respond to a standard work challenge, would you say that there is a set of 'shared values' amongst all the staff?
		Out of every ten [10] officers above SGL 7, how many people from this organization participate in groups, committees and activities with other people from this organization outside of the formal structure of government (for example, in community or social organizations)?

Table A2-G: Defining Management Practices, Ghana

Management Practice	Topic	Ghana questions	Score 1	Score 3	Score 5
CS-Autonomy	Roles	Can most senior staff in your division make substantive contributions to the policy formulation and implementation process?	Senior staff do not have channels to make substantive contributions to organizational policies, nor to the management of their implementation.	Substantive contributions can be made in staff meetings by all senior staff but there are no individual channels for ideas to flow up the organization.	It is integral to the organization's culture that any member of senior staff can substantively contribute to the policies of the organization or their implementation.
		When senior staff in your division are given tasks in their daily work, how much discretion do they have to carry out their assignments? Can you give me an example?	Officers in this division have no real independence to make decisions over how they carry out their daily assignments. Their activities are defined in detail by senior colleagues or organizational guidelines.	Officers in this division have some independence as to how they work, but strong guidance from senior colleagues, or from rules and regulations.	Officers in this division have a lot of independence as to how they go about their daily duties.
		Is the burden of achieving your division's targets evenly distributed across its different officers, or do some individuals consistently shoulder a greater burden than others?	A small minority of staff undertake the vast majority of substantive work within the division.	A majority of staff make valuable inputs, but it is by no means everyone who pulls their weight.	Each member of the division provides an equally valuable contribution, working where they can provide their highest value.
		Would you say that senior staff try to use the right staff for the right job?	Often tasks are not staffed by the appropriate staff. Staff are allocated to tasks either randomly, or for reasons that are not associated with productivity.	Most jobs have the right staff on them, but there are organizational constraints that limit the extent to which effective matching happens.	The right staff are always used for a task.
	Flexibility	Does your division make efforts to adjust to the specific needs and peculiarities of communities, clients, or other stakeholders?	The division uses the same procedures no matter what. In the face of specific needs or community/ client peculiarities, it does not try to develop a 'better fit' but automatically uses the default procedures.	The division makes steps towards responding to specific needs and peculiarities, but stumbles if the specific needs are complex. Often, tailoring of services is often unsuccessful.	The division always redefines its procedures to respond to the needs of communities/ clients. It does its best to serve each individual need as best as it can.
		How flexible would you say your division is in terms of responding to new and improved work practices?	There is no effort to incorporate new ideas or practices. When practice improvements do happen, there is no effort to disseminate them through the division.	New ideas or practices are sometimes adopted but in an ad hoc way. These are sometimes shared informally or in a limited way, but the division does not actively encourage this or monitor their adoption.	Seeking out and adopting improved work practices is an integral part of the division's work. Improvements are systematically disseminated throughout the division and their adoption is monitored.
CS-Incentives/Monitoring	Performance Incentives	Given past experience, how would under-performance be tolerated in your division?	Poor performance is not addressed or is inconsistently addressed. Poor performers rarely suffer consequences or are removed from their positions.	Poor performance is addressed, but on an ad hoc basis. Use of intermediate interventions, such as training, is inconsistent. Poor performers are sometimes removed from their positions under conditions of repeated poor performance.	Repeated poor performance is systematically addressed, beginning with targeted intermediate interventions. Persistently poor performers are moved to less critical roles or out of the organization.
		Given past experience, are members of [respondent's organization] disciplined for breaking the rules of the civil service?	Breaking the rules of the civil service does not carry any consequences in this division. Guilty parties do not receive the stipulated punishment.	An officer may break the rules infrequently and not be punished. An officer who regularly breaks the rules may be disciplined, but there would be no other specific actions beyond this. The underlying drivers of the behavior can persist indefinitely.	Any officer who breaks the rules of the civil service is punished; the underlying driver is identified and rectified. On-going efforts are made to ensure the issue does not arise again.
		Does your division use performance, targets, or indicators for tracking and rewarding (financially or non-financially) the performance of its officers?	Officers in the division are rewarded (or not rewarded) in the same way irrespective of their performance.	The evaluation system awards good performance in principle (financially or non-financially), but awards are not based on clear criteria/processes.	The evaluation system rewards individuals (financially or non-financially) based on performance. Rewards are given as a consequence of well-defined and monitored individual achievements.
	Monitoring	In what kind of ways does your division track how well it is delivering services? Can you give me an example?	Measures tracked are not appropriate or do not indicate directly if overall objectives are being met. Tracking is an ad hoc process and most processes aren't tracked at all. Tracking is dominated by the head of the division.	Performance indicators have been specified but may not be relevant to the division's objectives. The division has inclusive staff meetings where staff discuss how they are doing as division.	Performance is continuously tracked, both formally with key performance indicators and informally, using appropriate indicators and including many of the divisional staff.
CS-Other	Staffing	Do you think about attracting talented people to your division and then doing your best to keep them? For example, by ensuring they are happy and engaged with their work.	Attracting, retaining and developing talent throughout the division is not a priority or is not possible given service rules.	Having top talent throughout the division is seen to be a key way to effectively deliver on the organizations mandate but there is no strategy to identify, attract or train such talent.	The division actively identifies and acts to attract talented people who will enrich the division. They then develop those individuals for the benefit of the division and try to retain their services.
		If two senior level staff joined your division five years ago and one was much better at their work than the other, would he/she be promoted through the service faster?	The division promotes people by tenure only, and thus performance does not play a role in promotion.	There is some scope for high performers to move up through the service faster than non-performers in this division, but the process is gradual and vulnerable to inefficiencies.	The division would certainly promote the high-performer faster, and would rapidly move them to a senior position to capitalize on their skills.
	Targeting	Does your division have a clear set of targets derived from the organization's goals and objectives? Are they used to determine your work schedule?	The division's targets are very loosely defined or not defined at all; if they exist, they are rarely used to determine our work schedule and our activities are based on ad hoc directives from senior management.	Targets are defined for the division and its individual officers (managers and staff). However, their use is relatively ad hoc and many of the division's activities do not relate to those targets.	Targets are defined for the division and individuals (managers and staff) and they provide a clear guide to the division and its staff as to what the division should do. They are frequently discussed and used to benchmark performance.
		When you arrive at work each day, do you and your colleagues know what their individual roles and responsibilities are in achieving the organization's goals?	No. There is a general level of confusion as to what the organization is trying to achieve on a daily basis and what individual's roles are towards those goals.	To some extent, or at least on some days. The organization's main goals and individual's roles to achieve them are relatively clear, but it is sometimes difficult to see how current activities are moving us towards those.	Yes. It is always clear to the body of staff what the organization is aiming to achieve with the days activities and what individual's roles and responsibilities are towards that.

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